Write your name here

Surname	Other names

Pearson BTEC Level 1/Level 2 First Award

Centre Number

Learner Registration Number

Applied Science

Unit 1: Principles of Science

Monday 16 May 2016 – Morning
Time: 1 hour

Paper Reference
20460E

You must have:
Calculator

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 54.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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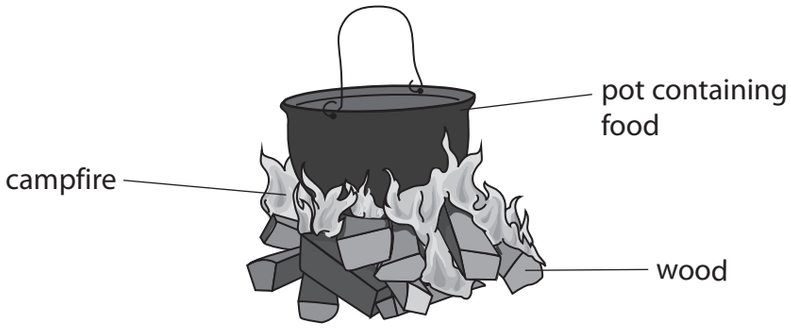
PEARSON

Answer ALL questions. Write your answers in the spaces provided.

SECTION A: Physics

1 The drawing shows some food cooking on a campfire.

The fuel used for the campfire is wood.



(a) Name the type of energy stored in the wood.

(1)

.....

(b) The burning wood releases energy.

Some of the energy cooks the food.

Some of the energy is wasted.

(i) Name the type of energy that cooks the food.

(1)

.....

(ii) Name the type of energy wasted.

(1)

.....

(c) Wood is a renewable source of energy.

State why wood is a renewable source of energy.

(1)

.....

(Total for Question 1 = 4 marks)

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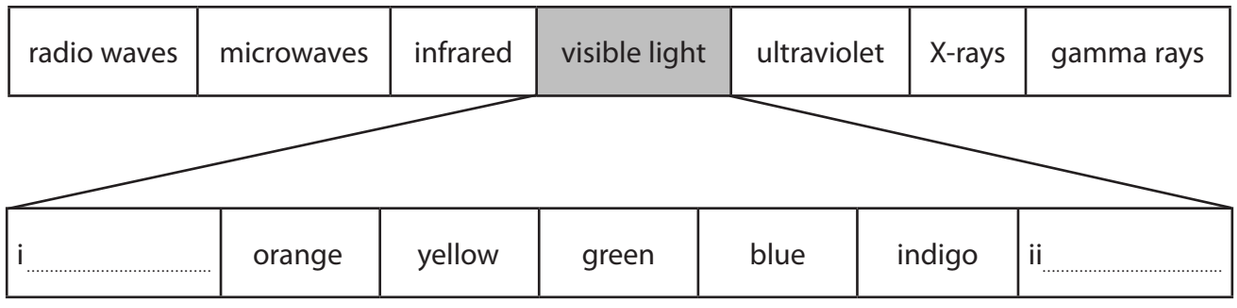
2 (a) The diagram shows the electromagnetic spectrum and the visible light spectrum.

The visible light spectrum contains seven different colours.

Complete the diagram to show the missing colours of the visible light spectrum.

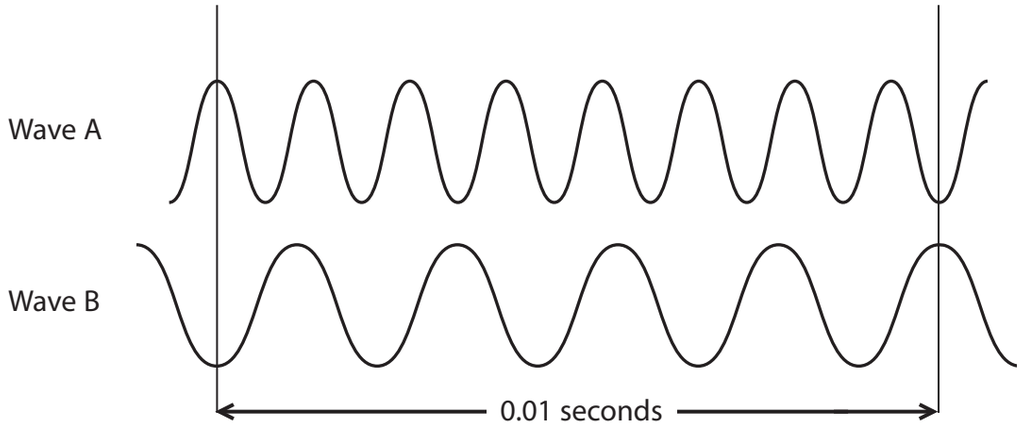
(2)

electromagnetic spectrum



visible light spectrum

(b) The diagram shows two waves, Wave A and Wave B.



(i) Explain how the diagram shows that Wave A has a higher frequency than Wave B.

(2)

.....

.....

.....

.....

(ii) Wave B has a wave speed of 800 m/s and a frequency of 400 Hz.

Calculate the wavelength of Wave B.

wave speed (m/s) = wavelength (m) × frequency (Hz)

Show your working.

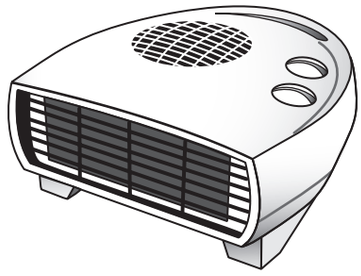
(2)

.....m

(Total for Question 2 = 6 marks)

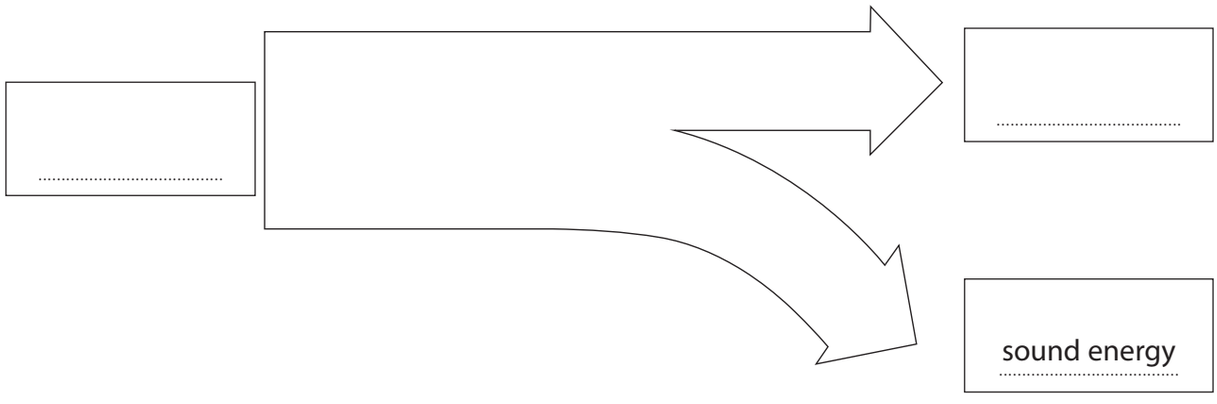
3 (a) The drawing shows a fan heater.

The fan heater uses electricity.



(i) Complete the energy transfer diagram for the fan heater.

(2)



(ii) The fan heater uses 180 000 J of energy in 2 minutes.

Calculate the power of the fan heater.

$$\text{power (watts)} = \frac{\text{energy (joules)}}{\text{time (secs)}}$$

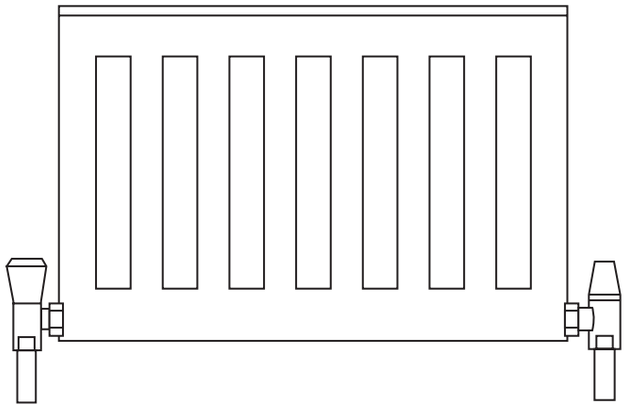
Show your working.

(2)

..... W

(b) The diagram shows a metal radiator.

The radiator is used to heat the room.



Hot water is pumped through the metal radiator.

Explain how conduction and convection transfer the thermal energy from the hot water to the room.

(4)

conduction .....

.....

.....

.....

convection .....

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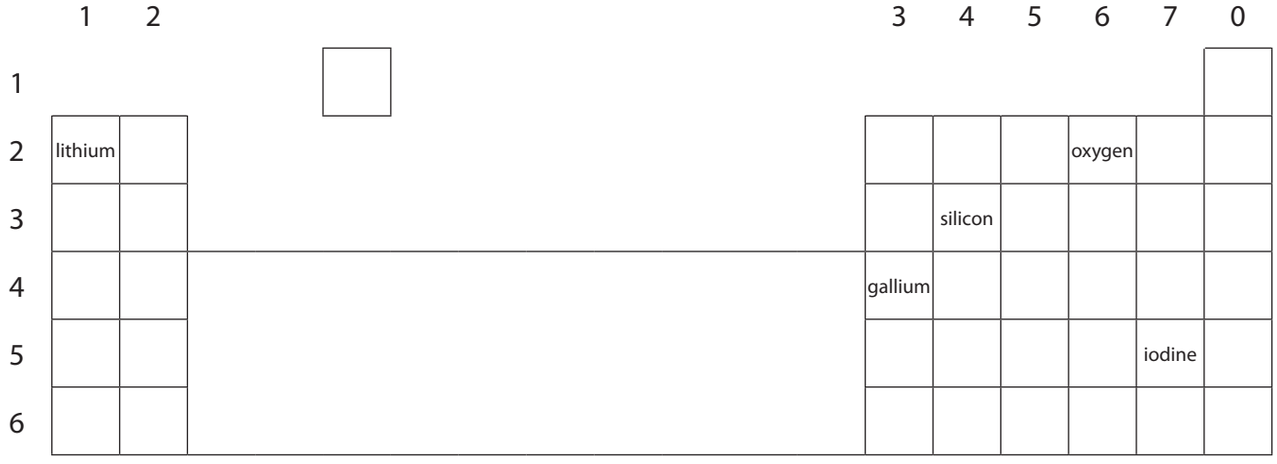
(Total for Question 3 = 8 marks)

TOTAL FOR SECTION A = 18 MARKS

SECTION B: Chemistry

4 The diagram shows a periodic table.



(a) (i) Identify the element shown in **group 7** of the periodic table.

(1)

.....

(ii) Identify the element shown in **period 3** of the periodic table.

(1)

.....

(b) Nitrogen is in group 5 of the periodic table.

Give the number of electrons in the outer shell of a nitrogen atom.

(1)

.....

(c) Oxygen is a molecule.

(i) Give the formula for a molecule of oxygen.

(1)

.....

(ii) Explain what is meant by the term **molecule**.

(2)

.....

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.....

(Total for Question 4 = 6 marks)

5 (a) When carbon dioxide dissolves in water carbonic acid can form.

Carbonic acid is a weak acid.

(i) Name an indicator used to test the pH of an acid.

(1)

.....

(ii) Suggest a value for the pH of carbonic acid.

(1)

.....

(b) Describe the test for carbon dioxide.

(2)

Test .....

.....

Result.....

.....

(c) Carbon-12 and carbon-13 are two naturally occurring isotopes of carbon.

A sample of carbon contains 99.00% carbon-12 and 1.00% carbon-13.

Calculate the relative atomic mass, RAM, of this sample of carbon.

Show your working.

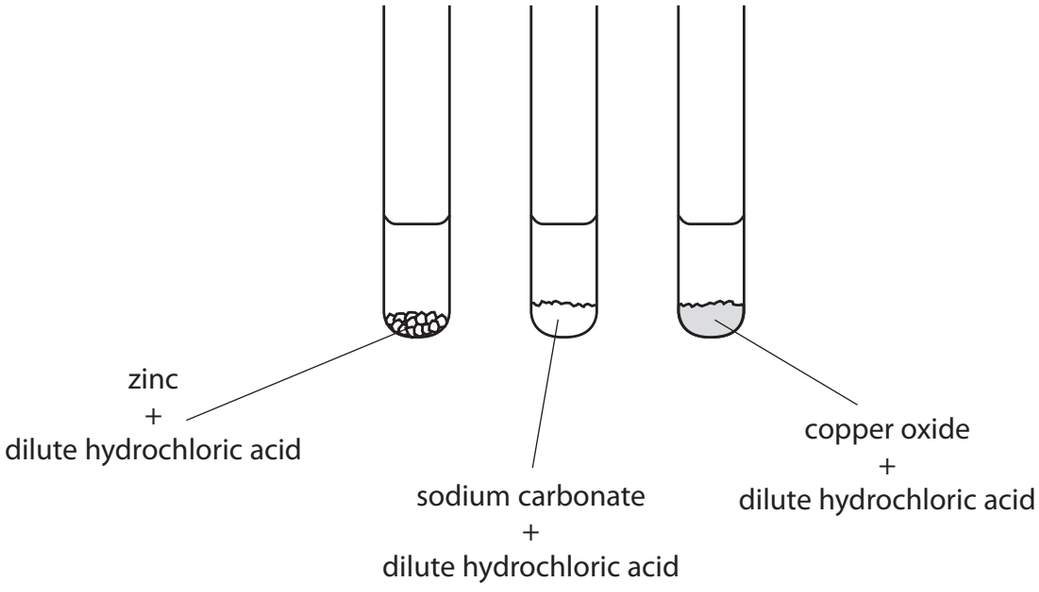
(2)

RAM .....

(Total for Question 5 = 6 marks)

6 Nicola investigates some reactions using dilute hydrochloric acid.

She reacts zinc, sodium carbonate and copper oxide with separate samples of dilute hydrochloric acid.



Describe the similarities and differences in the **products** of the three reactions.

(6)

(Total for Question 6 = 6 marks)

TOTAL FOR SECTION B = 18 MARKS

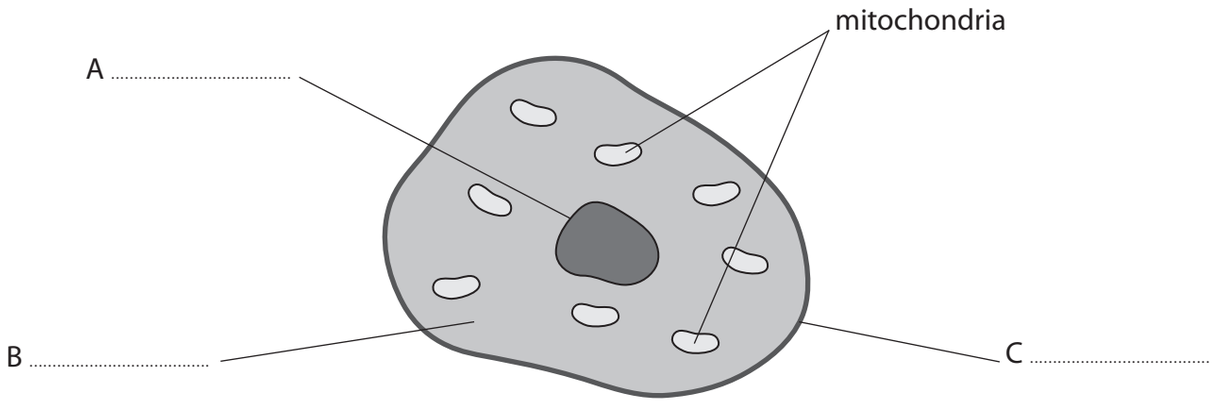
SECTION C: Biology

7 The diagram shows an egg cell.

Some of the mitochondria have been labelled.

(a) Complete the labels, **A**, **B** and **C**, for the other components of the egg cell.

(3)



(b) State **one** function of the mitochondria.

(1)

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.....

(Total for Question 7 = 4 marks)

8 (a) The root is a plant organ.

Roots contain phloem.

(i) State **one** function of the root of a plant.

(1)

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(ii) Give the function of the phloem.

(1)

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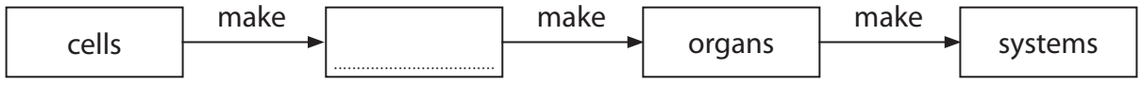
(b) (i) Complete the diagram.

(1)



(ii) Name the system in the human body that contains the heart and blood vessels.

(1)

.....

(c) The endocrine system and nervous system send messages around the human body.

Describe differences in the way that the endocrine system and the nervous system send messages around the human body.

(4)

(Total for Question 8 = 8 marks)

9 Malik runs on a running machine at the gym.

The table shows Malik's body temperature before running and after running.

	body temperature (°C)
before running	37.2
after running	37.7

After 30 minutes of rest Malik's body temperature has returned to 37.2 °C.

Explain how Malik's body works to lower his body temperature from 37.7 °C back down to 37.2 °C.

(6)

(Total for Question 9 = 6 marks)

TOTAL FOR SECTION C = 18 MARKS
TOTAL FOR PAPER = 54 MARKS